XXXVII. *An Account of an Obſervation of the Tranſit of* Venus, *made at* Iſle Coudre *near* Quebec. *In a Letter to the Reverend* Nevil Maſkelyne, *Aſtronomer Royal, from Mr.* Thomas Wright, *Deputy Surveyor of the Northern Diſtrict of* America.

Quebec, June 15, 1769.

SIR,

Read Nov. 16, 1769. I WAS prevented landing at the bay of Gaſpée, as I purpoſed (by blowing, thick weather); but, however, I had the good fortune to reach the iſland of Coudre, where I landed, with all my apparatus, the 30th of May; and took up my abode at a houſe well ſituated, in every reſpect, for my purpoſe. The next morning I had a carpenter, who fixed my clock, very firm and perpendicular, againſt a beam of the houſe. I immediately ſet it a-going by my watch, which had not been ſet to true time for almoſt a fortnight; but, however, I doubt not but that the following obſervations of correſponding altitudes will ſhew exactly the time, as

alſo the regular rate of going of the clock, which I did not venture to adjuſt, my time being ſhort.

As it is likely I may ſtay here ſome time, and all next winter, I ſhall endeavour to make ſuch obſervations as may be uſeful in further ſettling the longitude here.

Captain Holland obſerved the external contact, but not the internal, being prevented by clouds. He has ſent them to you by this opportunity.

I am,

SIR,

Your moſt obedient,

humble ſervant,

Tho. Wright.

Correſponding double altitudes of the Sun's lower limb, taken with a braſs ſextant, by reflection, from a ſaucer of oil, ſo placed as not to be the leaſt diſturbed with wind.

Thurſday, June 1, on the north-weſt ſide of the iſland of Coudre, in latitude 47° 16′ 30″, determined by ſeveral obſervations of two altitudes, with the interval of time ſhewn by the time-piece.

Morning, June 1.			Dou. alt.		Afternoon.			Compared ſeparately give		
h	′	″	°	′	h	′	″	h	′	″
At 8	29	45	75	38	At 4	8	54	12	19	19
8	32	52	76	42	4	5	37	12	19	14
8	35	50	77	43	4	2	39	12	19	14
8	38	31	78	38	4	0	0	12	19	15
8	40	53	79	26	3	57	24	12	19	08
8	43	34	80	20	3	55	0	12	19	17
8	36	54	Mean		4	1	36	Mean 12	19	15 Mean
16	01	36			Add 12					
7	24	42	Interval		16	01	36			
3	42	21	Half Interval							
8	36	54	Time in the morn.							
12	19	15								
—00	00	06	Equat. of correſponding alt.							
12	19	09	Time ſhewn by clock at apparent noon							
	+2	35	Equation of time—from apparent noon							
12	21	44	Clock too faſt for mean time							

Friday, June 2.

	Morning. h ′ ″	Dou. alt. ⊙ low. limb. ° ′	Afternoon. h ′ ″	Compared ſeparately. h ′ ″
At	8 54 28	84 19	3 42 20	12 18 24
	8 56 40	85 00	3 40 12	12 18 26
	8 58 50	85 45	3 38 02	12 18 26
	9 2 34	87 00	3 34 13	12 18 24
	9 4 2	87 27	3 32 45	12 18 24
	8 59 19	Mean	3 37 30	Mean
	15 37 30		12	
	6 38 11	Interval	15 37 30	
	3 19 5½	Half Interval		
	8 59 19			
	12 18 24½			
	—4	Equat. of correſponding altitudes		
	12 18 20½	Clock too faſt for apparent time		
	+2 26	Equation of time—from apparent		
	12 20 46½	Clock too faſt for mean time		
	21 44	Clock too faſt at noon of June 1		
	0 57½	Clock has loſt in 24 hours		

Saturday, June 3, the morning cloudy, no altitudes taken.

h ′ ″

At 2 49 22 by the clock, I happened to take my eye off from the very point where I afterwards found the external contact happened, imagining I ſaw it ſomething more to weſtward; but, finding my miſtake, I returned to the former point, where I found Venus had made a very ſmall

2 50 25 impreſſion at 2^h 50′ 25″, as is ſet down in the margin.

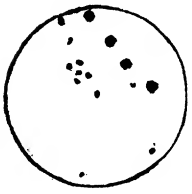
3 07 48 time when Venus appeared compleatly round to the eye, and to appearance rather detached, and joined by a ſmall dark thread or ligament, which prevented the rays of light from appearing.

3 08 19 time when the rays of light juſt appeared, at the internal contact.

The

The following is the above times, as ſhewn by the clock, reduced to apparent time, by allowing a proportion of 57 ſeconds, its regular loſing in 24 hours; as appears by the preceding and the following correſponding altitudes.

h	′	″		′	″	h	′	″	
2	49	22	——	17	32	= 2	31	50	apparent time of the 1ſt obſervation.
2	50	25	——	17	32	= 2	32	53	apparent time of the 2d obſervation.
3	7	48	——	17	31	= 2	50	17	ap. time of 1ſt obſ. of internal contact.
3	8	19	——	17	31	= 2	50	48	ap. time of 2d obſ. of internal contact.



The appearance of Venus at the internal contact, when joined by a ſmall thread to the Sun's limb; as alſo the ſpots of the Sun, as obſerved at the time of the tranſit, and two days before.

By means of two oblong ſmoaked glaſſes with different ſhades, made to ſlide in a groove fixed to my teleſcope, the phænomenon appeared very diſtinct and pleaſing to the eye, notwithſtanding the weather was a little hazy, and very much ſo, near the horizon. The thermometer ſtood at 74 degrees at the time of obſervation, and the weather was remarkably cloſe and ſultry two days before, and quite calm till an hour before the tranſit happened, when it began to blow very freſh. June 4, the weather continued much the ſame, and about 9^h 30′ in the evening, we had a ſhock of an earthquake, which laſted about four ſeconds, and alarmed all the inhabitants of the iſland.

The weather, at the time of the tranſit, was not clear enough to obſerve the leaſt appearance of an atmoſphere round the planet, ſuppoſing there really had been one.

Saturday

Saturday, June 3, correſponding double altitudes of the Sun's lower limb for midnight, taken in a ſaucer of oil.

June 3, Afternoon.			Altitude.		Morn. June 4.			Compared ſeparately.		
	h	′	″	o ′		h	′	″	h	′	″
At	4	4	25	76 58		8	29	41	12	17	03
	4	6	43	76 10		8	27	21	12	17	02
	4	8	34	75 33		8	25	26	12	17	0
	4	10	42	74 50		8	23	20	12	17	01
	4	12	52	74 08		8	21	11	12	17	02
	4	8	39	Mean		8	25	24	Mean		
	20	25	24			12					
	16	16	45	Interval		20	25	24			
	8	08	22½	Half Interval							
	4	08	39								
	12	17	01½	Time of midnight as ſhewn by clock							
			+9	Equat. of correſponding altitudes							
	12	17	10½	Clock too faſt for apparent time of midnight							
		+2	11	Equation of time—from apparent							
	12	19	21½	Clock too faſt for mean time							
		20	47	Clock too faſt, June 2, at noon							
		1	25½	Clock has loſt in 36 hours							
			57½	Clock loſt in 24 hours by the preceding obſervations							
			28½	Clock loſt in 12 hours by the preſent obſervation, which is very near at the ſame rate.							

Double altitudes, taken with a ſextant, in a ſaucer of oil, for finding the lat. of the place of obſervation.

June 4, morn.			Alt. ⊙ l. limb.		Afternoon.			Doub. alt. ⊙ l. limb.		
	h	′	″	o ′		h	′	″	o ′	
At	10	34	7	115 12		2	1	50	114 36	There is 3′ to be
	10	36	44	116 00		2	4	32	113 46	ſubtracted from the
	10	37	40	116 13		2	6	24	113 20	half ∠ for the er-
	10	39	26	116 38		2	8	05	112 50	rors of quadrant.

By

By the firſt of the above obſervations with a ſuppoſed lat. = 47° 15′, being the reſult of a former obſervation, and the Sun's declination (corrected for the longitude) = 22° 31′ 51″ N. and half the elapſed ⌒ = 1ʰ 43′ 51″½ the latitude will be found = 47° 16′ 51″, N.

By the ſecond obſervation, computed in the like manner, the latitude will be 47° 16′ 41″, N.

The place of obſervation on the iſland of Coudre, by an actual ſurvey, bears from Quebec, N. 41° 30′, E. by the true meridian, diſtance 55 ſtatute miles, = 52 marine; which gives D. latitude = 39′ and Dep. 34′ = 50′ D. longitude = 3′ 20″ of time between Quebec and Coudre.

I have here mentioned every particular relative to the obſervation, and as it really happened, that you might, with greater certainty, correct any errors that may be found therein.

To prove the time aſcertained by correſponding equal altitudes, thoſe altitudes taken within an hour of the tranſit might be worked ſeparately, remembering to ſubtract 3′ from the ſingle altitude for the error of the quadrant.

Remarks by the Astronomer Royal.

THE inſtruments made uſe of by Mr. Wright, in the foregoing obſervations, were a 2 feet reflecting teleſcope; a pendulum clock beating half ſeconds; a braſs Hadley's ſextant, of about 15 inches radius, with a magnifying glaſs to read off the obſervations; and a rectangular reſervoir for holding quick-ſilver,

ſilver, or any other fluid, which is ſheltered from the wind by two glaſs ſides inclined to one another, and ground truly plane: this laſt for taking the Sun's double altitude by reflection with the Hadley's ſextant. By a more accurate calculation of the times than Mr. Wright has uſed, I find the equation of correſponding altitudes, for the noon of June 1 to be $-5'',0$, June 2 $-4'',5$, and June 3 for midnight $+9'',6$. Hence the true time of noon, by the clock, June 1, was $12^h\ 19'\ 10'',0$; June 2, $12^h\ 18'\ 20'',0$; and June 3, midnight, $12^h\ 17'\ 11'',1$; and hence the true time of noon, June 3, ſhould be $12^h\ 17'\ 34'',1$, and the clock is loſing $46''$ per day on apparent time. Hence the apparent times of Mr. Wright's 4 obſervations will come out as follows:

App. time.	
h ′ ″	
2 31 53	No viſible impreſſion made by Venus yet.
2 32 56	Venus had made a ſmall impreſſion.
2 50 19	Venus appeared completely round to the eye, and rather detached, and joined by a ligament.
2 50 50	The rays of light appeared at the internal contact.

Taking Iſle Coudre to bear N. 41° 30′ Eaſt from Quebec, diſtant 55 ſtatute miles, as, Mr. Wright ſays, was found by an actual ſurvey; the diſtance in geographical miles is 47,65. Therefore the place of obſervation is $35'\ 41''$ north of Quebec, and $31'\ 34''$ eaſt of it, $= 46'\ 32''$ difference of longitude, $= 3\ 6''$ of time.

XXXVIII. *Ex-*